IBM System x3850 X6

IBM Redbooks Product Guide

The IBM® System x3850 X6 server is a four-socket 4U rack-mounted server that represents the sixth generation of the IBM Enterprise X-Architecture®. It delivers fast application performance, is based on an agile system design, and is a resilient platform that is needed for mission-critical databases, enterprise applications, and virtualized environments.

The x3850 X6 packs numerous fault-tolerant and high-availability features into a high-density, 4U rack-optimized lid-less package that helps reduce the space that is needed to support massive network computing operations and simplify servicing. The x3850 X6 supports up to four Intel Xeon E7-4800/8800 v2 high-performance processors and up to 6 TB of memory.

Suggested use: mission-critical scalable databases, business analytics, virtualization, enterprise applications, and cloud applications.

The following figure shows the IBM System x3850 X6.

Figure 1. The IBM System x3850 X6

Did you know?

The x3850 X6 server employs a lid-less design where all serviceable components are front- and rear-accessible. In addition, each major subsystem is implemented as modular "book" design, such as the Compute Books and I/O Books. This configuration means that components are easy to upgrade and service, which translates to greater uptime of applications to your users. The x3850 X6 offers enterprise scalability and advanced RAS features to support the most demanding mission-critical applications that require 24x7 operations.

Key features

The increasing demand for cloud-computing and analytics workloads by enterprises to meet social, mobile, and Big Data requirements drives innovation to find new ways to build informational systems. Clients are looking for cost-optimized fit-for-purpose IT solutions that manage large amounts of data, easily scale performance, and provide enterprise class reliability.

Built on decades of innovation, IBM introduces its sixth generation of Enterprise X-Architecture technology, IBM X6 servers. IBM X6 servers are fast, agile, and resilient:

- *Fast* application performance means immediate access to actionable information.
- *Agile* system design helps to reduce acquisition costs and provide the ability to upgrade processor and memory technology at each refresh within the same chassis.
- *Resilient* platforms maximize application uptime and promote easy integration in virtual environments.

IBM X6 servers continue to lead the way as the shift toward mission-critical scalable databases, business analytics, virtualization, enterprise applications, and cloud-computing applications accelerates.

Fast application performance

The server offer numerous features to boost performance:

- Supports IBM memory-channel storage and IBM eXFlash DIMMs, where solid-state storage devices are installed in memory DIMM sockets. These devices are directly connected to the processors and provide the lowest latency values in the industry.
- Based on the Intel Xeon processor E7-4800 v2 and E7-8800 v2 product family:
  - Supports up to four E7-4800 v2 processors with 60 cores and 120 threads to maximize the concurrent running of multi-threaded applications.
  - Improves productivity by offering superior system performance with 15-core processors (up to 2.8 GHz core speeds), up to 37.5 MB of L3 cache, and up to three 8 GTps QPI interconnect links.
- Supports memory speeds up to 1600 MHz.
- Supports up to 96 DIMM sockets, with 24 DIMMs per processor.
- With eXFlash memory-channel storage, the server delivers up to 12.8 TB of ultra-low latency flash memory by using IBM WriteNow technology, which is ideal for high-performance applications.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows processor cores to run at maximum speeds during peak workloads by temporarily going beyond processor thermal design power (TDP).
- Intel Hyper-Threading Technology boosts performance for multi-threaded applications by enabling simultaneous multi-threading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Intel Advanced Vector Extensions (AVT) improve floating-point performance for compute-intensive technical and scientific applications.
- Supports a 12 Gbps SAS RAID portfolio.
- The usage of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs) can improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.

- PCI Express 3.0 I/O adapter slots that improve the theoretical maximum bandwidth by almost 100% (8 GTps per link using 128b/130b encoding) compared to the previous generation of PCI Express 2.0 (5 GTps per link using 8b/10b encoding).
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E7-4800/8800 v2 product families. This integration helps reduce I/O latency and increase overall system performance.
- Support for up to two graphics processing units (GPUs) and co-processors to maximize computing power.
- Energy-efficient electronic components help lower operational costs, including highly efficient 900 W AC and 1400 W AC power supplies with 80 PLUS Platinum certification.

Agile system design

The server provides many scalability and flexibility features:

- Innovative module "book" design for each of the three subsystems: Compute Books, Storage Book, and I/O Books. Front and rear access means that you can easily scale the system by adding components without removing the entire server from the rack.
- The modular book design also allows clients to create the configuration that fits their application and environment needs, which reduces acquisition costs while giving them the flexibility to grow and modify their configuration later.
- The book design also means that subsystem upgrades are simpler, quicker to perform, and have a lower impact on the rest of the server.
- Using 64 GB LRDIMMs, the server supports up to 6 TB of memory.
- Up to 32 eXFlash DIMMs are supported for a total of 12.8 TB of low-latency and high-performance storage.
- Up to 16x 1.8-inch eXFlash SSD bays, or up to eight 2.5-inch bays, provide a flexible and scalable all-in-one platform to meet your increasing demands.
- Offers up to 11 PCIe slots plus a dedicated Mezzanine LOM (ML2) adapter slot. Most slots are PCIe 3.0 to maximize I/O scalability.
- PCIe slots are implemented in I/O Books to maximize modularity. Choose from Half-length I/O Books or Full-length I/O Books, depending on the adapters that you need to deploy.
- Most components are common between the four-socket x3850 X6 and eight-socket x3950 X6, making for a simple upgrade path with minimal parts on the floor.

Resilient platform

The server provides many features to simplify serviceability and increase system uptime:

- Upward Integration Modules for standard hypervisors enable the creation and management of policies to maintain high availability of virtual machines and concurrent updating of the system firmware, with no impact on application performance or availability.
- Advanced Processor Recovery allows the system to automatically switch access and control of networking, management, and storage in the event of a processor 1 failure, providing higher availability and productivity.
- Advanced Page Retire proactively protects applications from corrupted pages in memory, which is crucial for scaling memory to terabytes.
- Redundant bit steering, memory mirroring, and memory rank sparing for redundancy in the event of a non-correctable memory failure.

- Intel Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supported operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, which is protected from all other software running on a system.
- Redundant Intel Platform Controller Hub (PCH) connections to the processors allow the platform to maintain access to networking, storage, and server management during a processor failure.
- IBM eXFlash DIMMs support RAID 1 mirroring for data protection.
- Hot-swap drives support RAID redundancy for data protection and greater system uptime.
- Hot-swap I/O Books enabling you to install or replace adapters while the server is still running.
- Tool-less lid-less design provides front and rear access for easy upgrades and serviceability. There is no need to pull the server out of the rack to access internal components.
- Hot-swap power supplies and hot-swap dual-motor redundant fans provide availability for mission-critical applications.
- A new LCD diagnostics panel that is combined with individual light path diagnostic LEDs quickly lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Predictive Failure Analysis (PFA) detects when system components (processors, VRMs, memory, HDDs, fans, and power supplies) operate outside of standard thresholds and generates proactive alerts in advance of a possible failure, therefore increasing uptime.
- Built-in Integrated Management Module Version II (IMM2) continuously monitors system parameters, triggers alerts, and performs recovering actions in case of failures to minimize downtime.
- Includes a special Mezzanine LOM (ML2) adapter slot with support for adapters with either two 10 Gb ports or 4 Gb ports. Supports direct connectivity to the IMM2 service processor for out-of-band systems management.
- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Two integrated Trusted Platform Modules (TPMs) 1.2 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster and stronger encryption.
- IBM Systems Director® provides proactive systems management. It offers comprehensive systems management tools that help increase uptime, reduce costs, and improve productivity through advanced server management capabilities.
- Solid-state drives (SSDs) offer better reliability than traditional mechanical HDDs for greater uptime.
- Built-in diagnostic tests, using Dynamic Systems Analysis (DSA) Preboot, speed up troubleshooting tasks to reduce service time.
- Three-year customer-replaceable unit and onsite limited warranty, 9x5 next business day. Optional service upgrades are available.

Locations of key components and connectors

The following figure shows the front of the x3850 X6 server.

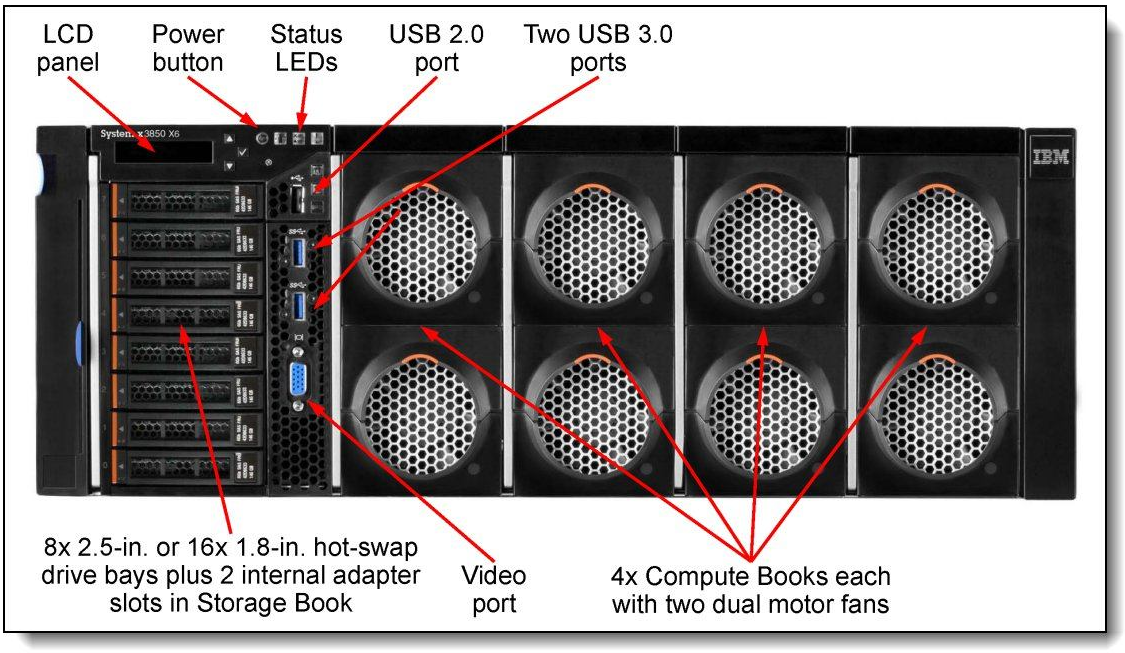
LCD panel
Power button
Status LEDs
USB 2.0 port
Two USB 3.0 ports
8x 2.5-in. or 16x 1.8-in. hot-swap drive bays plus 2 internal adapter slots in Storage Book
Video port
4x Compute Books each with two dual motor fans

Figure 2. Front view of the IBM System x3850 X6

The following figure shows the rear of the x3850 X6 server.

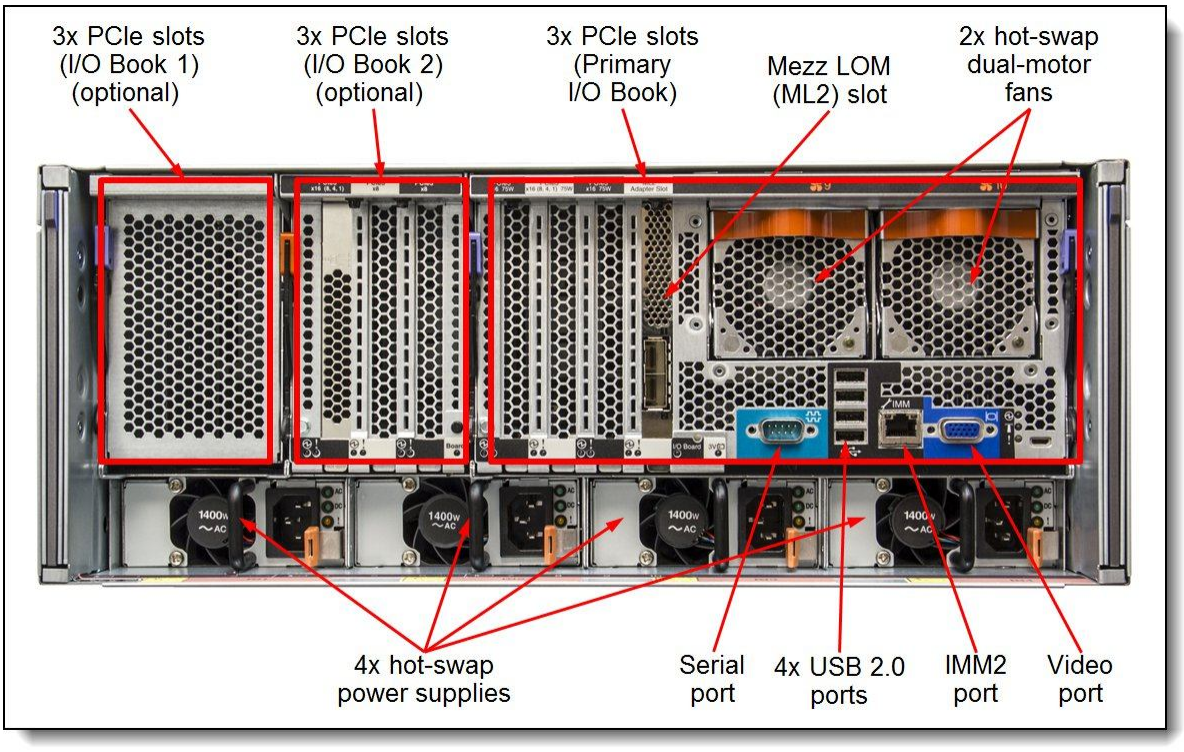
3x PCIe slots (I/O Book 1) (optional)
3x PCIe slots (I/O Book 2) (optional)
3x PCIe slots (Primary I/O Book)
Mezz LOM (ML2) slot
2x hot-swap dual-motor fans
4x hot-swap power supplies
Serial port
4x USB 2.0 ports
IMM2 port
Video port

Figure 3. Rear view of the IBM System x3850 X6

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (Part 1)

Components	Specification
Form factor	4U rack.
Processor	Up to four Intel Xeon E7-4800 v2 or E7-8800 v2 processors, each in a Compute Book. Each processor has either 15 cores (up to 2.8 GHz), 12 cores (up to 2.6 GHz), 10 cores (up to 2.2 GHz), eight cores (up to 2.0 GHz), or six cores (up to 3.4 GHz). There are three QPI links up to 8.0 GTps each. Up to 1600 MHz memory speed. Up to 37.5 MB L3 cache. Intel C602J chipset.
Memory	Up to 96 DIMM sockets (24 DIMMs per processor, installed in the Compute Book). RDIMMs and LRDIMMs (Load Reduced DIMMs) are supported, but memory types cannot be intermixed. Memory speed up to 1600 MHz.
Memory maximums	With RDIMMs: Up to 1.5 TB with 96x 16 GB RDIMMs and four processors. With LRDIMMs: Up to 6 TB with 96x 64 GB LRDIMMs and four processors.
Memory protection	ECC, Chipkill, RBS, memory mirroring, and memory rank sparing.
Memory-channel storage	IBM eXFlash DIMMs are installed in memory DIMM slots, but are seen by the OS as storage devices. Memory channels with eXFlash DIMMs must also have at least one RDIMM. Cannot be mixed with LRDIMMs. A maximum of 32 eXFlash DIMMs can be installed. Maximum 12.8 TB with 32x 400GB eXFlash DIMMs.
Disk drive bays	Up to sixteen 1.8-inch eXFlash SSD bays, or up to eight 2.5-inch hot-swap SAS/SATA bays.
Maximum internal storage	Up to 12.8 TB with 1.6 TB 2.5-inch SAS SSDs, or up to 9.6 TB with 1.2 TB 2.5-inch SAS HDDs, up to 8 TB with 1 TB 2.5-inch NL SAS/SATA HDDs, up to 6.4 TB with 400 GB 1.8-inch SATA SSDs.
RAID support	12 Gb SAS/SATA RAID 0, 1, or 10 with ServeRAID M5210; optional upgrades to RAID 5 and 50 are available (zero-cache; 1 GB non-backed cache; 1 GB or 2 GB flash-backed cache). Upgrades to RAID 6 or 60 available for M5210 with 1 GB or 2 GB upgrades.
Optical and tape bays	None. Supports external USB optical drives.
Network interfaces	Mezzanine LOM (ML2) slot for dual-port 10 GbE cards with SFP+ or RJ-45 connectors or quad-port GbE cards with RJ-45 connectors. See Table 2. Dedicated 1 GbE port for systems management.
PCI Expansion slots	Up to 11 PCIe slots plus dedicated Mezzanine LOM slot. The slots are as follows: ● Two PCIe 3.0 x8 slots for internal RAID controllers (Storage Book) ● Two PCIe 3.0 x16 slots (x16-wired), half length, full height (Primary I/O Book) ● One PCIe 3.0 x16 (x8-wired), half length, full height (Primary I/O Book) ● One ML2 slot for network adapter (PCIe 3.0 x8) (Primary I/O Book) ● Two optional I/O Books, each with three slots, all full height (using these I/O Books requires four processors). Optional books are hot-swap capable. Optional I/O Books can be either of the following options: ● Half-length I/O Book: Two PCIe 3.0 x8 slots, one PCIe 3.0 x16 slot. ● Full-length I/O Book: Two PCIe 3.0 x16, one PCIe 2.0 x4 slot; two aux power connectors: 150 W and 75 W. Supports one double-wide GPU up to 300 W.
Ports	Front: Two USB 3.0, one USB 2.0, and one DB-15 video ports. Rear: Four USB 2.0, one DB-15 video, one DB-9 serial, and one 1 GbE RJ-45 systems management. Internal: USB 2.0 port for embedded hypervisor.
Cooling	IBM Calibrated Vectored Cooling™. Up to ten redundant hot-swap fan packs and five fan zones with N+1 fan redundancy. Each fan pack includes two counter-rotated dual-motor fans.

Table 1. Standard specifications (Part 2)

Components	Specification
Power supply	Up to four redundant hot-swap 900 W AC or 1400 W AC power supplies (all 80 PLUS Platinum certified). -48 V 750 W DC power supplies are available through CTO. Power supplies cannot be mixed.
Hot-swap parts	Drives, power supplies, fans, and optional I/O Books.
Video	Matrox G200eR2 with 16 MB memory that is integrated into the IMM2. Maximum resolution is 1600 x 1200 at 75 Hz with 16 M colors.
Security features	Power-on password, admin password, and two Trusted Platform Modules (TPMs).
Systems management	UEFI, IBM Integrated Management Module II (IMM2) with remote presence feature, Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and Active Energy Manager™, and IBM ServerGuide.
Operating systems supported	Microsoft Windows Server 2012 R2, 2012, and 2008 R2, Red Hat Enterprise Linux 6, SUSE Linux Enterprise Server 11, and VMware vSphere ESXi 5.1 and 5.5.
Limited warranty	Three-year customer-replaceable unit (CRU) and onsite limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through IBM ServicePac® offerings: 4-hour or 2-hour response time, 8-hour fix time, 1-year or 2-year warranty extension, and remote technical support for IBM hardware and some IBM / OEM applications.
Dimensions	Height: 173 mm (6.8 in.), width: 482 mm (19.0 in.), depth: 804 mm (31.6 in.), depth with Full-length I/O Book installed: 903 mm (35.5 in.).
Weight	Minimum configuration: 35.9 kg (79.2 lb), typical: 46.4 kg (102.3 lb), maximum: 54.7 kg (120 lb)

The server is shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Rack Installation Instructions
- Documentation CD that contains the *Installation and Service Guide*
- IBM Systems Director Flyer
- IBM System x® Rail Kit
- 2.8 m (9.18 ft) C13-C14 power cord (one for each power supply)

Standard models

The following table lists the standard models.

Table 2. Standard models

Model†	Intel Xeon Processor** (in a Compute Book)	Memory (1600 MHz)	eXFlash DIMMs	RAID	Drive bays	Drives	Ethernet‡ (ML2 slot)	I/O slots§	Power supplies
Standard x3850 X6 models									
3837-A4x	1x Xeon E7-4809 v2 6C 1.9GHz 12MB 105W	2x 8GB	Optional	Optional	Optional	Optional	4x 1 GbE	6 std 12 max	1x 900W HS / 4
3837-B1x	2x Xeon E7-4820 v2 8C 2.0GHz 16MB 105W	4x 8GB	Optional	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	6 std 12 max	2x 900W HS / 4
3837-B3x	2x Xeon E7-4850 v2 12C 2.3GHz 24MB 105W	4x 8GB	Optional	1x M5210	4x 2.5" HS / 8	Open	2x 10 GbE‡	6 std 12 max	2x 900W HS / 4
3837-C1x	2x Xeon E7-4860 v2 12C 2.6GHz 30MB 130W	4x 8GB	Optional	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	6 std 12 max	2x 900W HS / 4
3837-C4x	2x Xeon E7-4890 v2 15C 2.8GHz 37.5MB 155W	4x 4GB	Optional	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	6 std 12 max	2x 900W HS / 4
eXFlash Engines - include IBM eXFlash DIMMs and IBM FlashCache Storage Accelerator									
3837-A7x *	4x Xeon E7-4809 v2 6C 1.9GHz 12MB 105W	80x 16 GB	8x 400GB	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	9 std 12 max	4x 1400W HS / 4
3837-A8x *	4x Xeon E7-4809 v2 6C 1.9GHz 12MB 105W	64x 16 GB	4x 200GB	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	9 std 12 max	4x 1400W HS / 4
3837-A9x *	4x Xeon E7-4809 v2 6C 1.9GHz 12MB 105W	95x 16 GB	1x 400GB	1x M5210	4x 2.5" HS / 8	Open	4x 1 GbE	9 std 12 max	4x 1400W HS / 4

† x in the Machine Type Model (MTM) represents a country-specific letter (for example, the EMEA MTM is 3837-A3G, and the US MTM is 3837-A4U). Ask an IBM representative for specifics.
** Processor detail: Processor quantity and model, cores, core speed, L3 cache, and TDP.
* Models A7x and A8x include IBM FlashCache Storage Accelerator for Direct v2.x; model A9x includes IBM FlashCache Storage Accelerator for Virtual v2.x. All models include 3 years service and support
‡ Model B3x includes the Broadcom NetXtreme II ML2 Dual Port 10GbE SFP+ adapter (BCM57810S based). All other models include Intel I350-T4 ML2 Quad Port GbE Adapter adapter (I350-AM4 based).
§ Models with six slots have the Primary I/O Book (four slots) and Storage Book (two slots) standard. Models with nine slots also include one Half-length I/O Book.

For more information about the standard features of the server, see the "Specifications" section.

Upgrading to x3950 X6

The x3850 X6 server supports up to four Compute Books (four processors and 96 DIMM sockets).

The x3850 X6 server has a flexible modular design that allows you to increase the server's compute power and I/O capabilities by adding additional Compute Books and I/O Books. The modular design also means that if your business needs additional processing or I/O capability within the same system image, then it is possible to migrate to an eight-socket x3950 X6.

IBM offers one method to do this upgrade now and plans to offer a second RPQ method:

- Purchase an x3950 X6 with four Compute Books, and move your existing Compute Books, I/O Books, and Storage Books from the x3850 X6 to the new x3950 X6. This requires the processors in the x3850 X6 to be the same E7-8800 v2 processors as in the x3950 X6. Also, the serial number on the 8-way server x3950 X6 will be different than the serial in the x3850 X6.
- Purchase an upgrade offering through RPQ (planned for 1H/2014). IBM plans to have a service offering where a service engineer comes onsite with the new mechanical chassis and performs the field upgrade by transferring all components to the new chassis. This method also requires the x3850 X6 compute books to be the same E7-8800 v2 processors as ordered for the RPQ, however, in this scenario, the server maintain the original serial number.

Note: Intel Xeon E7-4800 v2 processors cannot be used in an x3950 X6. If your x3850 X6 has Compute Books with E7-4800 v2 processors, then these must be replaced with Compute Books with E7-8800 v2 processors if you plan to upgrade to an x3950 X6. The memory in the Compute Books can be reused in the x3950 X6, however.

Processor options

The x3850 X6 supports up to four Intel Xeon E7 v2 processors. Processors are installed in Compute Books, one processor in each Compute Book. The following figure shows the components of the Compute Book:

- One processor
- A total of 24 DIMM slots, 12 on each side of the book
- Two hot-swap dual-motor fans that are mounted on the front of the book

The x3850 X6 supports two or four Compute Books. Three Compute Books are not supported. A configuration of one Compute Book is only supported in standard model 3837-A4x.

Each Compute Book is installed in the front of the server, as shown in the following figure.

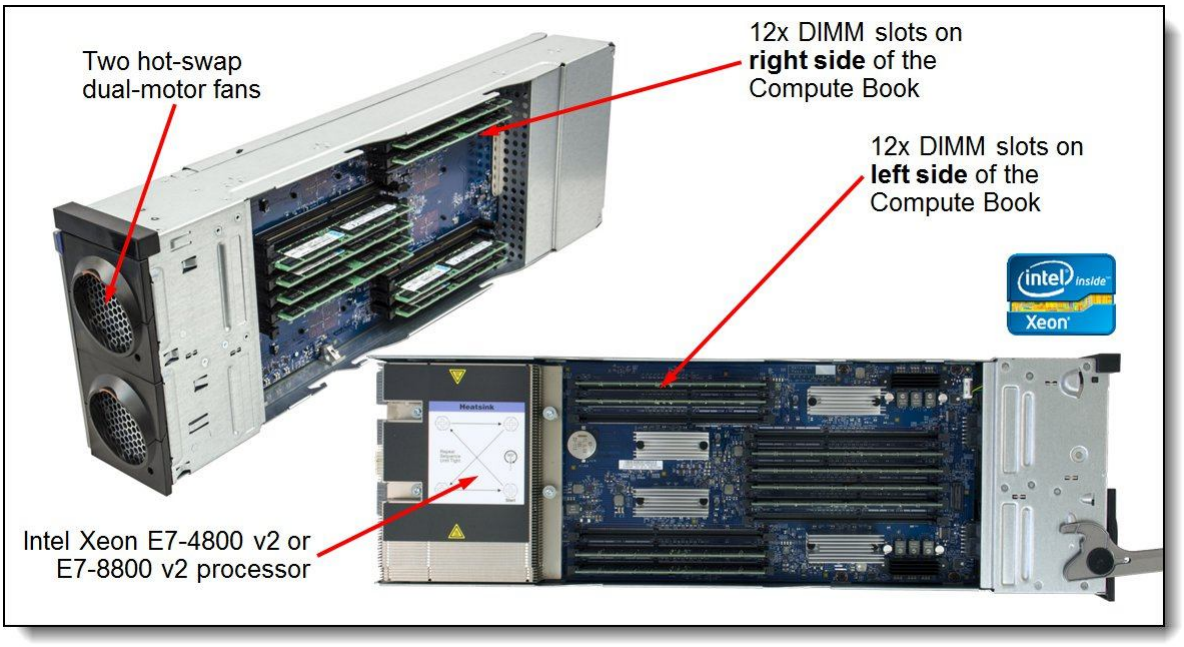
Two hot-swap dual-motor fans
12x DIMM slots on **right side** of the Compute Book
12x DIMM slots on **left side** of the Compute Book
intel inside
Xeon
Intel Xeon E7-4800 v2 or E7-8800 v2 processor

Figure 4. Compute Book

The following table shows the processor options. Each option includes the processor installed in a Compute Book. Compute Books with one of the E7-4800 family of processors are supported only in a four-socket x3850 X6 server and cannot be used in an x3950 X6 server.

The table also shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor, this processor is only available through CTO.

Table 3. Processor options

Part number	Feature code	Description (processor installed in a Compute Book)	Supported quantities x3850 X6*	x3850 X6 models where used
Intel Xeon E7-4800 v2 processor family (not supported in the x3950 X6)				
44X3961	A4B3	Intel Xeon E7-4809 v2 6C 1.9GHz 12MB 105W	2, 4	A4x, A7x, A8x, A9x
44X3966	A4B4	Intel Xeon E7-4820 v2 8C 2.0GHz 16MB 105W	2, 4	B1x
44X3971	A4B5	Intel Xeon E7-4830 v2 10C 2.2GHz 20MB 105W	2, 4	-
44X3976	A4B6	Intel Xeon E7-4850 v2 12C 2.3GHz 24MB 105W	2, 4	B3x
44X3981	A4B7	Intel Xeon E7-4860 v2 12C 2.6GHz 30MB 130W	2, 4	C1x
44X3986	A4B8	Intel Xeon E7-4870 v2 15C 2.3GHz 30MB 130W	2, 4	-
44X3991	A4B9	Intel Xeon E7-4880 v2 15C 2.5GHz 37.5MB 130W	2, 4	-
44X3996	A4BA	Intel Xeon E7-4890 v2 15C 2.8GHz 37.5MB 155W	2, 4	C4x
Intel Xeon E7-8800 v2 processor family (also supported in the x3950 X6)				
44X4001	A4BB	Intel Xeon E7-8850 v2 12C 2.3GHz 24MB 105W	2, 4	-
44X4031	A4BH	Intel Xeon E7-8857 v2 12C 3.0GHz 30MB 130W	2, 4	-
44X4011	A4BD	Intel Xeon E7-8870 v2 15C 2.3GHz 30MB 130W	2, 4	-
44X4016	A4BE	Intel Xeon E7-8880 v2 15C 2.5GHz 37.5MB 130W	2, 4	-
44X4036	A4BJ	Intel Xeon E7-8880L v2 15C 2.2GHz 37.5MB 105W	2, 4	-
44X4021	A4BF	Intel Xeon E7-8890 v2 15C 2.8GHz 37.5MB 155W	2, 4	-
44X4026	A4BG	Intel Xeon E7-8891 v2 10C 3.2GHz 37.5MB 155W	2, 4	-
44X4006	A4BC	Intel Xeon E7-8893 v2 6C 3.4GHz 37.5MB 155W	2, 4	-

* A configuration of one processor is only supported in model 3837-A4x. No other server model or CTO configuration supports one processor.

Memory options

IBM DDR3 memory is compatibility tested and tuned for optimal IBM System x® performance and throughput. IBM memory specifications are integrated into the light path diagnostics for immediate system performance feedback and optimum system uptime. From a service and support standpoint, IBM memory automatically assumes the IBM system warranty, and IBM provides service and support worldwide.

The x3850 X6 supports DDR3 memory operating at speeds up to 1600 MHz. The x3850 X6 supports up to 96 DIMMs when all processors are installed, 24 DIMMs per processor. Each processor has four memory channels that are implemented using Scalable Memory Interface generation 2 (SMI2) chips, and the server implements three DIMMs per channel. The processor and the corresponding memory DIMM slots are on the Compute Book.

The following table lists the memory options that are available for x3850 X6.

Table 4. Memory options

Part number	Feature code	Description	Maximum supported x3850 X6	Models where used
RDIMMs				
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	96 (24 per CPU)	-
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	96 (24 per CPU)	A4x, B1x, B3x, C1x, C4x,
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	96 92 (24 per CPU)	A7x, A8x, A9x
LRDIMMs				
46W0676	A3SR	32GB (1x32GB, 4Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP LRDIMM	96 (24 per CPU)	-
46W0741	A451	64GB (1x64GB, 8Rx4, 1.35V) PC3-10600 DDR3 1333MHz LP LRDIMM	96 (24 per CPU)	-

The following rules apply when selecting the memory configuration:

- The server supports RDIMMs and LRDIMMs.
- Mixing different types of memory (RDIMMs and LRDIMMs) is not supported.
- The maximum number of ranks per one DDR3 channel is six with RDIMMs or 24 with LRDIMMs.
- In RAS (lockstep) mode, DIMMs must be installed in a pair.
- The maximum quantity of DIMMs that can be installed in the server depends on the number of processors, DIMM type, rank, and operating voltage, as shown in the "Maximum qty supported" row in the following table.

- All DIMMs in the server operate at the same speed, which is determined as the lowest value of one of the following options:
  - Memory speed that is supported by the specific processor.
  - Lowest of maximum operating speeds for selected memory configuration that depends on rated speed, operating voltage, and quantity of DIMMs per channel, as shown under "Maximum operating speed" section in the following table.
- The server also supports IBM eXFlash DIMMs, which are also installed in the DIMM slots. The "IBM eXFlash memory-channel storage" section describes these eXFlash DIMMs and the configuration rules.

The following table shows the characteristics of the supported DIMMs. Tables cells that are highlighted with a gray background indicate that the server supports higher memory frequencies or larger memory capacity (or both) than the Intel processor specification defines.

Memory speed: In performance mode, memory channels operate independently, and the SMI2 link operates at twice the DDR3 speed. In RAS mode, two channels operate synchronously, and the SMI2 link operates at the DDR3 speed.

Table 5. Maximum memory speeds

DIMM specification	**RDIMM**				**LRDIMM**			
Rank	Single rank		Dual rank		Quad rank		8-rank	
Part numbers	00D5024 (4GB) 00D5036 (8GB)		46W0672 (16GB)		46W0676 (32GB)		46W0741 (64GB)	
Rated speed	1600 MHz		1600 MHz		1600 MHz		1333 MHz	
Rated voltage	1.35 V		1.35 V		1.35 V		1.35 V	
Operating voltage	1.35 V	1.5 V	1.35 V	1.5 V	1.35 V	1.5 V	1.35 V	1.5 V
Max qty supported*	96	96	96	96	96	96	96	96
Max DIMM capacity	8 GB	8 GB	16 GB	16 GB	32 GB	32 GB	64 GB	64 GB
Max memory capacity	0.75 TB	0.75 TB	1.5 TB	1.5 TB	3 TB	3 TB	6 TB	6 TB
Maximum operating speed - Performance mode (2:1 mode - SMI2 link operates at twice the DDR3 speed shown)								
1 DIMM per channel	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz
2 DIMMs per channel	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz
3 DIMMs per channel	1066 MHz	1333 MHz	1066 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz
Maximum operating speed - RAS mode (1:1 mode - SMI2 link operates at the DDR3 speed shown)								
1 DIMM per channel	1333 MHz	1600 MHz	1333 MHz	1600 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1333 MHz	1600 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz
3 DIMMs per channel	1066 MHz	1333 MHz	1066 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz	1333 MHz

* Maximum quantity supported is shown for all processors that are installed.

The following memory protection technologies are supported:

- ECC
- Chipkill (for x4-based memory DIMMs)
- Redundant bit steering (Double Device Data Correction)

- Memory mirroring
- Memory rank sparing

Chipkill and Redundant Bit Steering are supported in RAS mode. Chipkill is supported in Performance mode.

If memory mirroring is used, DIMMs must be installed in pairs for Performance mode (minimum of one pair per each processor) and quads for RAS mode. DIMMs in the pair/quad must be identical in type and size.

If memory rank sparing is used, then a minimum of two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need being identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs that are installed.

IBM eXFlash memory-channel storage

IBM eXFlash memory-channel storage are storage offerings in the physical form of memory DIMMs. These IBM eXFlash DIMMs are installed in memory DIMM sockets but appear to the operating system and applications as block storage devices. This new and innovative technology brings storage electrically closer to the processor subsystem, therefore improving performance considerably.

The following table shows the supported eXFlash DIMMs.

Table 6. Internal storage expansion options

Part number	Feature code	Name and description	Maximum supported
00FE000	A4GX	IBM eXFlash 200GB DDR3 Storage DIMM	32
00FE005	A4GY	IBM eXFlash 400GB DDR3 Storage DIMM	32

The following figure shows one eXFlash DIMM installed with RDIMMs in the Compute Book.

Figure 5. IBM eXFlash DIMM installed in the Compute Book

The following rules apply when building a server configuration with eXFlash DIMMs:

- The 200 GB and 400 GB eXFlash DIMMs cannot be mixed.
- RAID 1 mirroring is provided by the eXFlash DIMM device driver.
- Performance memory mode must be selected. RAS (lockstep) memory mode is not supported.
- Only RDIMMs are supported by eXFlash DIMMs; LRDIMMs are not supported
- The maximum quantities of eXFlash DIMMs are as follows:
  - One processor: 8 eXFlash DIMMs
  - Two processors: 16 eXFlash DIMMs
  - Four processors: 32 eXFlash DIMMs

Internal storage

The server supports 1.8-inch solid-state drives in the IBM eXFlash SSD units and 2.5-inch SSDs and HDDs. Drives are installed in the Storage Book. The x3850 X6 has one Storage Book. The Storage Book supports the following configurations:

- 4x 2.5-inch hot-swap drive bays
- 8x 2.5-inch hot-swap drive bays
- 4x 2.5-inch hot-swap drive bays + 8x 1.8-inch hot-swap SSD bays
- 8x 1.8-inch hot-swap SSD bays
- 16x 1.8-inch hot-swap SSD bays

The following figure shows these configurations.

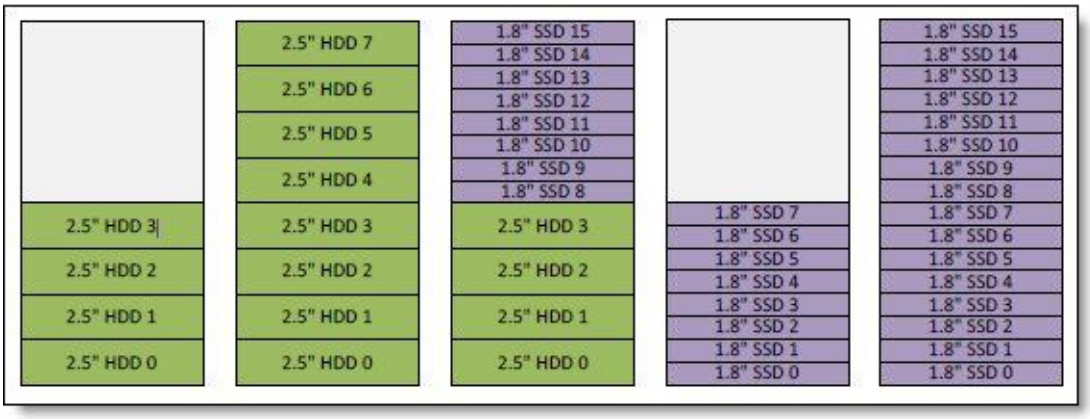

Figure 6. Internal drive configurations

Backplanes

All standard models ship with four 2.5-inch SAS/SATA hot-swap hard disk drive bays. The following table shows the internal storage expansion options that are available.

Table 7. Internal storage expansion options

Part number	Feature code	Description	Maximum supported x3850 X6
44X4104	A4A6	IBM 4x 2.5" HS 12Gb SAS HDD Backplane	2
44X4106	A4A7	IBM 8x 1.8" HS 12Gb SAS HDD Backplane	2

The backplanes are connected to one or two RAID controllers or HBAs depending on the number and type of backplane that is installed. The adapters are installed in PCIe slots in the Storage Book, as shown in the following figure.

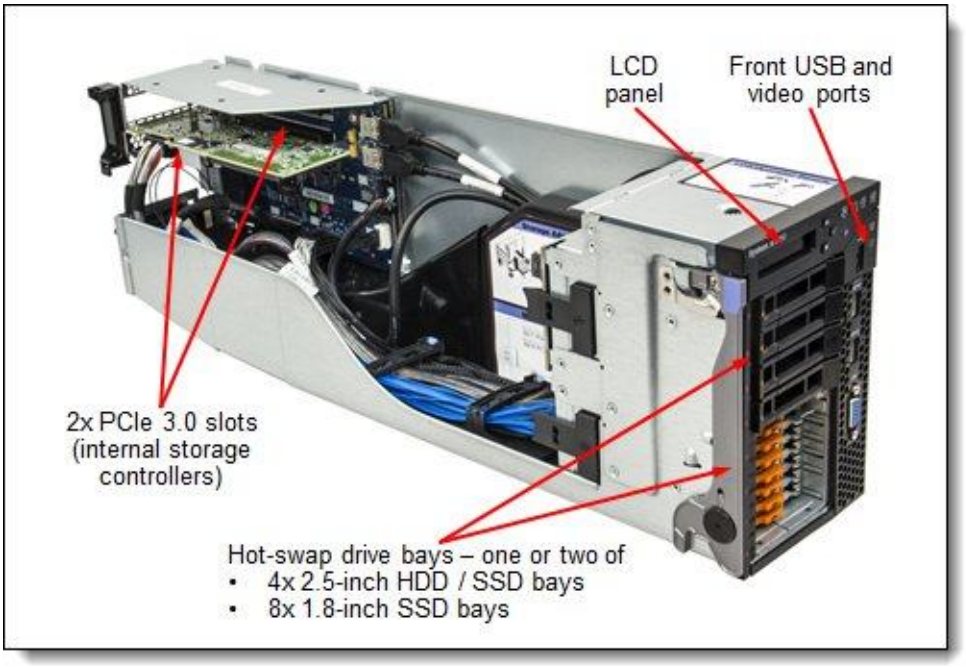
LCD panel
Front USB and video ports
2x PCIe 3.0 slots (internal storage controllers)
Hot-swap drive bays – one or two of
• 4x 2.5-inch HDD / SSD bays
• 8x 1.8-inch SSD bays

Figure 7. Storage Book

The following table shows the backplanes that are required per Storage Book and the number of adapters that are required.

Table 8. Drive combinations per Storage Book

Drive combination	Backplanes required	Controllers needed
4x 2.5-inch hot-swap drive bays	1x IBM 4x 2.5" HS 12Gb SAS HDD Backplane, 44X4104	1
8x 2.5-inch hot-swap drive bays	2x IBM 4x 2.5" HS 12Gb SAS HDD Backplane, 44X4104	1 or 2
4x 2.5-inch hot-swap drive bays + 8x 1.8-inch hot-swap SSD bays	1x IBM 4x 2.5" HS 12Gb SAS HDD Backplane, 44X4104 1x IBM 8x 1.8" HS 12Gb SAS HDD Backplane, 44X4106	2
8x 1.8-inch hot-swap SSD bays	1x IBM 8x 1.8" HS 12Gb SAS HDD Backplane, 44X4106	1
16x 1.8-inch hot-swap SSD bays	2x IBM 8x 1.8" HS 12Gb SAS HDD Backplane, 44X4106	2

Controllers for internal storage

The following table lists the RAID controllers, HBAs, and additional hardware and feature upgrades that are used for internal disk storage. The adapters are installed in slots in the Storage Book.

Table 9. RAID controllers and HBAs for internal storage

Part number	Feature code	Description	Maximum supported x3850 X6	Where used
46C9110	A3YZ	ServeRAID M5210 SAS/SATA Controller	2	All models
47C8675	A3YY	N2215 SAS/SATA HBA for IBM System x	2	-
Hardware upgrades for the M5210				
47C8656	A3Z0	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	2	-
47C8660	A3Z1	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	2	-
47C8664	A3Z2	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	2	-
Features on Demand upgrades for the M5210				
47C8708	A3Z6	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade	1	-
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade	1*	-
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator	1*	-
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler	1*	-

* These M5210 features upgrades require a cache memory upgrade (47C8656, 47C8660, or 47C8664).

The ServeRAID M5210 SAS/SATA Controller has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID 0, 1, and 10
- Supports RAID 5 and 50 with optional M5200 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports 1 GB non-backed cache or 1 GB or 2 GB flash-backed cache
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller

The IBM N2215 SAS/SATA HBA has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3008 12 Gbps controller

For more information, see the list of IBM Redbooks® Product Guides in the RAID adapters category at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=raid

Internal drive options

The following table lists hard disk drive options for internal storage.

Table 10. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description	Maximum supported x3850 X6
1.8" SATA HS SSDs			
41Y8366	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	16
41Y8371	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	16
2.5" SAS HS SSDs			
00AJ207	A4UA	IBM 200GB SAS 2.5" MLC G3HS Enterprise SSD	8
00AJ212	A4UB	IBM 400GB SAS 2.5" MLC G3HS Enterprise SSD	8
00AJ217	A4UC	IBM 800GB SAS 2.5" MLC G3HS Enterprise SSD	8
00AJ222	A4UD	IBM 1.6TB SAS 2.5" MLC G3HS Enterprise SSD	8
2.5" SATA HS SSDs			
00AJ156	A4U3	S3700 200GB SATA 2.5" MLC G3HS Enterprise SSD	8
00AJ161	A4U4	S3700 400GB SATA 2.5" MLC G3HS Enterprise SSD	8
00AJ166	A4U5	S3700 800GB SATA 2.5" MLC G3HS Enterprise SSD	8
2.5" NL SAS HS HDDs			
00AJ121	A4TT	IBM 500GB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	8
00AJ086	A4TU	IBM 1TB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	8
2.5" NL SATA HS HDDs			
00AJ131	A4TV	IBM 250GB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	8
00AJ136	A4TW	IBM 500GB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	8
00AJ141	A4TX	IBM 1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	8
2.5" 15K SAS HS HDDs			
00AJ081	A4TR	IBM 300GB 15K 6Gbps SAS 2.5" G3HS HDD	8
00AJ111	A4TQ	IBM 146GB 15K 6Gbps SAS 2.5" G3HS HDD	8
2.5" 10K SAS HS HDDs			
00AJ146	A4TP	IBM 1.2TB 10K 6Gbps SAS 2.5" G3HS HDD	8
00AJ071	A4TN	IBM 900GB 10K 6Gbps SAS 2.5" G3HS HDD	8
00AJ091	A4TM	IBM 600GB 10K 6Gbps SAS 2.5" G3HS HDD	8
00AJ096	A4TL	IBM 300GB 10K 6Gbps SAS 2.5" G3HS HDD	8

Table 10. Disk drive options for internal disk storage (Part 2)

Part number	Feature code	Description	Maximum supported x3850 X6
2.5" SAS HS SEDs			
00AJ116	A4U2	IBM 146GB 15K 6Gbps SAS 2.5" G3HS SED	8
00AJ106	A4TY	IBM 300GB 10K 6Gbps SAS 2.5" G3HS SED	8
00AJ101	A4TZ	IBM 600GB 10K 6Gbps SAS 2.5" G3HS SED	8
00AJ076	A4U0	IBM 900GB 10K 6Gbps SAS 2.5" G3HS SED	8
00AJ151	A4U1	IBM 1.2TB 10K 6Gbps SAS 2.5" G3HS SED	8

Internal backup units

The server does not support internal tape drive options.

Optical drives

The server does not support internal optical drives.

I/O expansion options

The server supports up to 11 PCIe slots plus dedicated Mezzanine LOM slot (12 total) as follows:

- In the Storage Book (standard in all models): Two PCIe 3.0 x8 slots for supported internal RAID controllers and SAS HBAs
- In the Primary I/O Book (standard in all models):
  - Two PCIe 3.0 x16 slots (x16-wired), half length, full height, up to 75 W of power
  - One PCIe 3.0 x16 (x8-wired), half length, full height, up to 75 W of power
  - One mezzanine LOM 2 (ML2) slot for network adapters with the new ML2 form factor (PCIe 3.0 x8)
- Two optional I/O Books, each with three slots, all full height. Optional I/O Books are enabled for hot-swap.

The following figure shows the Primary I/O Book with the air baffle raised to show the internals.

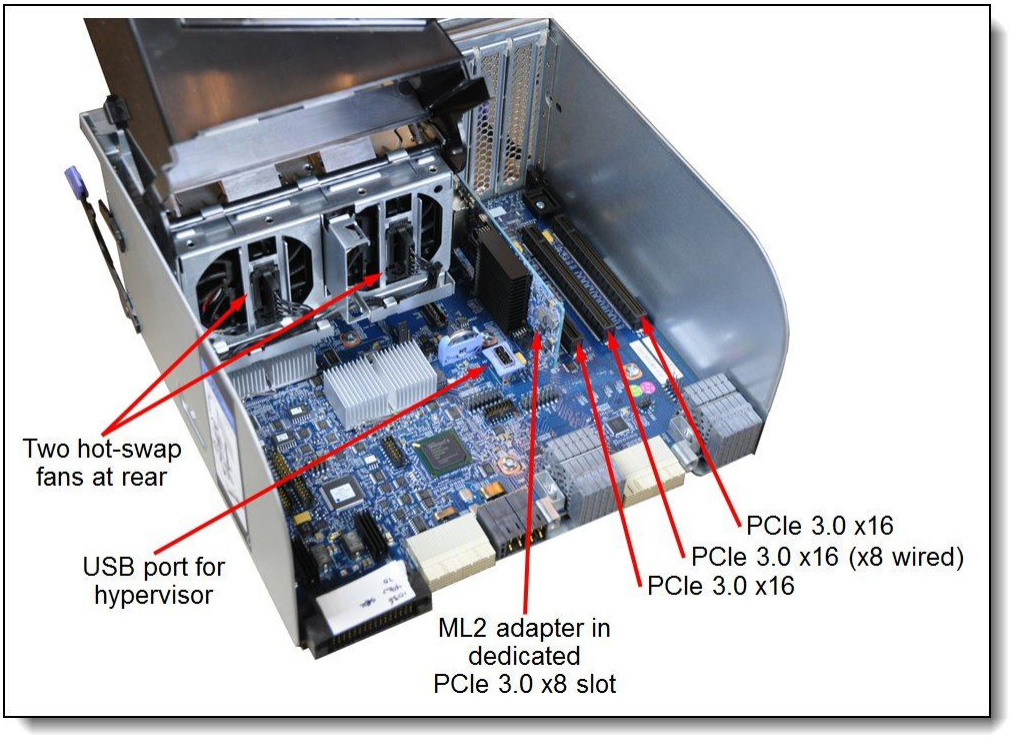
Two hot-swap fans at rear
USB port for hypervisor
ML2 adapter in dedicated PCIe 3.0 x8 slot
PCIe 3.0 x16
PCIe 3.0 x16 (x8 wired)
PCIe 3.0 x16

Figure 8. Primary I/O Book

Optional I/O Books can be either of:

- Half-length I/O Book:
  - Two PCIe 3.0 x8 slots (x8 wired)
  - One PCIe 3.0 x16 slot (x16 wired)
- Full-length I/O Book:
  - Two PCIe 3.0 x16 (x16 wired)
  - One PCIe 2.0 x8 slot (x4 wired)

In order for an I/O Book to be hot-swappable, all adapters that are installed in the book must support hot-swap and the operating system must also support hot-swap. These operating systems support hot-swap:

- Windows Server 2008 R2
- Windows Server 2012
- Windows Server 2012 R2

The adapters listed in the following table support hot-swap.

Table 11. Adapters that support hot swap

Part number	Feature code	Description
00D8540	A4XH	Emulex Dual Port 10GbE SFP+ VFA IIIr for IBM System x*
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x

* Hot-swap is only supported when the adapter is in pNIC mode. Hot-swap is not supported in either vNIC mode (IBM Virtual Fabric mode or Switch Independent mode).

The usage of these Optional I/O Books requires all four processors to be installed.

The following table shows the ordering information for the optional I/O Books.

Table 12. I/O Book options

Part number	Feature code	Description	Maximum supported x3850 X6
44X4049	A4A2	X6 Half-Length I/O Book	2
44X4051	A4A3*	X6 Full-Length I/O Book	2

* The Full-length I/O Book can be ordered only as an option. It is not available through CTO because the Full-length I/O Book cannot be shipped installed in the server

The following figure shows the two optional I/O Books, the Half-length I/O Book and the Full-length I/O Book.

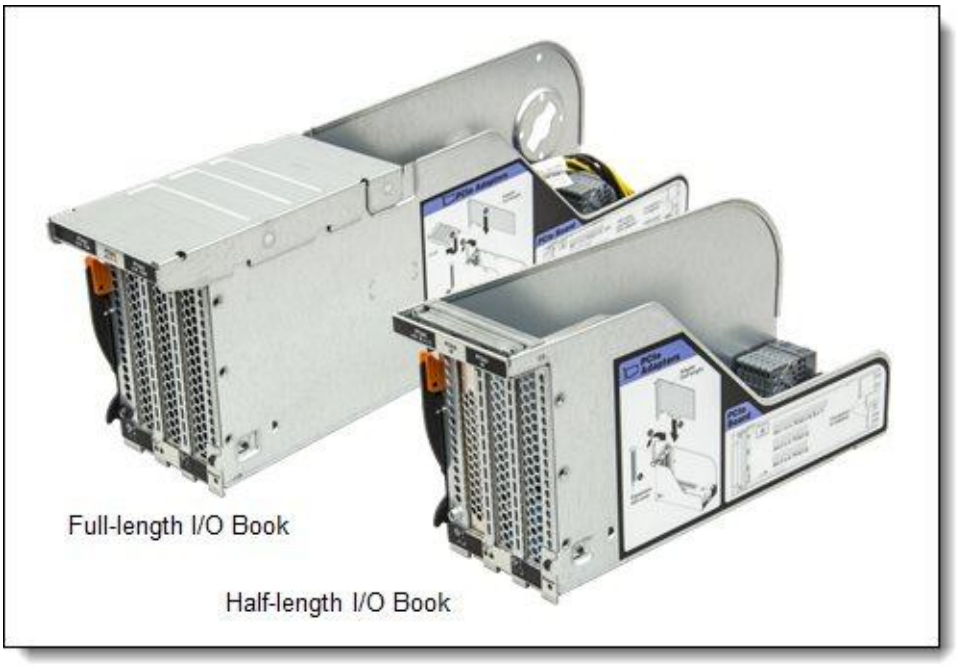

Figure 9. Half-length I/O Book and the Full-length I/O Book

The following figure shows the inside of the Half-length I/O Book.

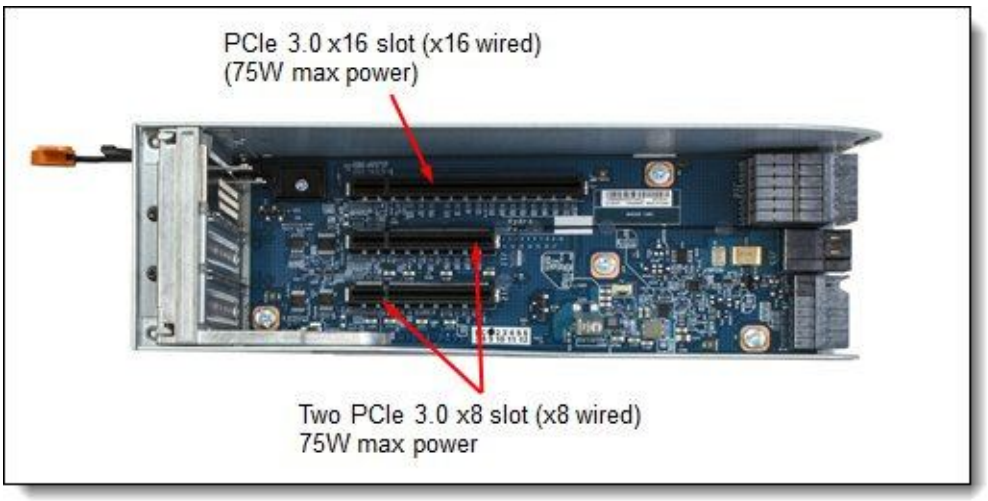

Figure 10. Half-length I/O Book

Each slot in the Half-length I/O Book and the Full-length I/O Book supplies up to 75 W of power.

The Full-length I/O Book also includes two auxiliary power connectors. With the use of these connectors and the supplied power cords, the I/O book supports one double-wide adapter up to 300 W. The auxiliary power connectors are as follows:

- One 2x4 power connector, which supplies up to 150 W of additional power to the adapter
- One 2x3 power connector, which supplies up to 75 W of additional power to the adapter

The combined power consumption of all the adapters that are installed in the Full-length I/O Book cannot exceed 300 W.

Note: The 2x3 connector is intended to be used only when one adapter is installed in the first x16 slot (the up-most slot in the following figure), either requiring 225 W or 300 W of power. The location of the 2x3 connector prevents an adapter from being installed in the other x16 slot.

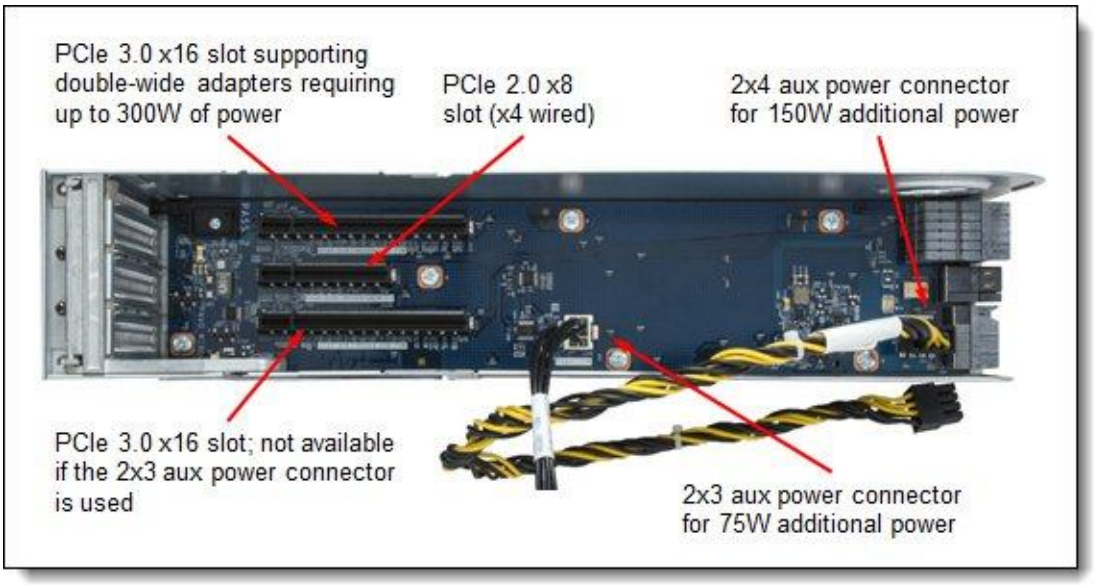
PCIe 3.0 x16 slot supporting double-wide adapters requiring up to 300W of power
PCIe 2.0 x8 slot (x4 wired)
2x4 aux power connector for 150W additional power
PCIe 3.0 x16 slot; not available if the 2x3 aux power connector is used
2x3 aux power connector for 75W additional power

Figure 11. Full-length I/O Book

The Half-length I/O Book installs flush with the Primary I/O Book at the rear of the server. The Full-length I/O Book, when installed, adds a 76 mm (3 in.) mechanical extension to the base length dimension of the chassis.

The following figure shows a Full-length I/O Book and a Half-length I/O Book that are installed in the server.

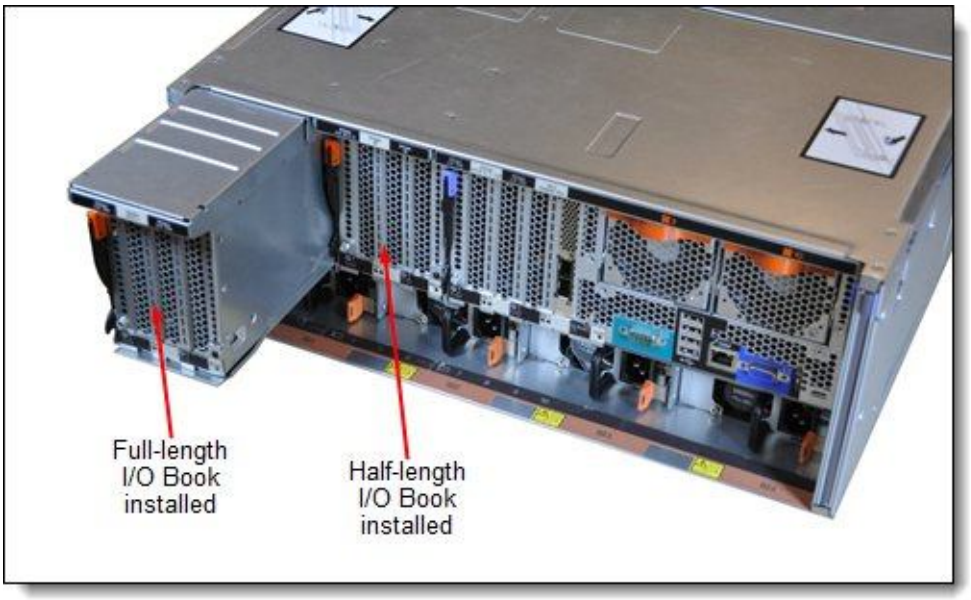

Figure 12. I/O Books that are installed in the x3850 X6

Network adapters

The server supports ML2 adapters that are installed in the custom ML2 slot. This slot supports adapters with either two 10 Gb ports or four Gigabit ports and supports direct connectivity to the IMM2 service processor for out-of-band systems management.

As listed in Table 2, Model B3x includes the Broadcom NetXtreme II ML2 Dual Port 10GbE SFP+ adapter as standard. All other standard models include an Intel I350-T4 ML2 Quad Port GbE Adapter (I350-AM4 based).

The Broadcom NetXtreme II ML2 Dual Port 10GbE SFP+ Adapter has the following specifications:

- Dual-port 10 Gb Ethernet connectivity
- Broadcom BCM57810S ASIC
- SFP+ ports supporting fiber optic and direct-attach copper (DAC) cables

For more information about this adapter, see the IBM Redbooks Product Guide found at the following address:
http://www.redbooks.ibm.com/abstracts/tips1027.html?Open

The Intel I350-T4 ML2 Quad Port GbE Adapter has the following specifications:

- Quad-port 1 Gb Ethernet connectivity
- Intel I350-AM4 ASIC
- RJ45 ports for copper cables

For more information about this adapter, see the IBM Redbooks Product Guide:
http://www.redbooks.ibm.com/abstracts/tips1155.html?Open

The following table lists the supported ML2 adapters.

Table 13. ML2 adapters

Part number	Feature code	Description	Maximum supported x3850 X6
00D2026	A40S	Broadcom NetXtreme II ML2 Dual Port 10GbaseT for IBM System x	1
00D2028	A40T	Broadcom NetXtreme II ML2 Dual Port 10GbE SFP+ for IBM System x	1
00D1996	A40Q	Emulex VFA5 ML2 Dual Port 10GbE SFP+ Adapter for IBM System x	1
00D8544	A4NZ	Emulex VFA5 ML2 FCoE/iSCSI License for IBM System x (FoD) (Features on Demand upgrade for 00D1996 - one for each adapter)	1
00D1994	A40P	Intel X540 ML2 Dual Port 10GbaseT Adapter for IBM System x	1
00D1998	A40R	Intel I350-T4 ML2 Quad Port GbE Adapter for IBM System x	1

The server also supports various other Ethernet and InfiniBand network adapters, as listed in the following table. The maximum quantity listed is for configurations with all processors and I/O books installed.

Table 14. Network adapters

Part number	Feature code	Description	Maximum supported x3850 X6
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter for IBM System x	9
10 Gb Ethernet			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for IBM System x	9
00D8540	A4M9	Emulex Dual Port 10GbE SFP+ VFA III-R for IBM System x	9
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	9
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	9
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x	9
42C1800	5751	QLogic 10Gb CNA for IBM System x	9
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA for IBM System x	9
47C9952	A47H	Solarflare SFN5162F 2x10GbE SFP+ Performant Adapter for IBM System x	9
47C9960	A47J	Solarflare SFN6122F 2x10GbE SFP+ Onload Adapter for IBM System x	9
Gigabit Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	9
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	9
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	9
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	9
InfiniBand			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter for IBM System x	9

For more information, see the list of IBM Redbooks Product Guides in the Networking adapters category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=networkadapters

Storage host bus adapters

The following table lists storage HBAs that are supported by the x3850 X6. The maximum quantity listed is for configurations with all processors and I/O books installed. The maximum quantity listed is for configurations with all processors and I/O books installed.

Table 15. Storage adapters

Part number	Feature code	Description	Maximum supported x3850 X6
Fibre Channel - 16 Gb			
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	9
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	9
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	9
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	9
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	9
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	9
Fibre Channel - 8 Gb			
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x	9
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x	9
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x	9
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x	9
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x	9
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x	9
SAS			
46C9010	A3MV	N2125 SAS/SATA HBA for IBM System x	9

For more information, see the list of IBM Redbooks Product Guides in the Host bus adapters category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=hba

PCIe SSD adapters

The server supports the High IOPS SSD adapters that are listed in the following table. The maximum quantity listed is for configurations with all processors and I/O books installed.

Table 16. SSD adapters

Part number	Feature code	Description	Maximum supported x3850 X6
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	9
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	9
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	9
90Y4397	A3DZ	IBM 2.4TB High IOPS MLC Duo Adapter	9

For more information about these adapters, see the IBM Redbooks Product Guide *IBM High IOPS MLC Adapters*, TIPS0907, found at the following address:
http://www.redbooks.ibm.com/abstracts/tips0907.html?Open

GPU adapters and co-processors

The server supports the co-processors and graphics processing units (GPUs) that are listed in the following table. Each is installed in a Full-length I/O Book. No other adapter can be installed in the Full-length I/O Book. The Full-length I/O Book includes the necessary auxiliary power cables.

Note: These adapters are not available through CTO and cannot be shipped installed in the server because they are installed in the Full-length I/O Book, which extends beyond the rear of the chassis (see Figure 11). These adapters must be shipped separately from the server.

Table 17. GPU adapters

Part number*	Feature code	Description	Maximum supported x3850 X6
90Y2404#	None*	Intel Xeon Phi 3120A	2
90Y2356#	None*	NVIDIA Grid K1	2
90Y2372#	None*	NVIDIA Quadro K6000	2
90Y2392#	None*	NVIDIA Tesla K20c	2
90Y2396#	None*	NVIDIA Grid K2 Actively Cooled	2

System building block (SBB) part number. Not available as an option part number.
* Not available through CTO.

Power supplies

The x3850 X6 server supports up to four redundant power supplies. Standard models come with one, two, or four power supplies (model dependent). The following table lists the power supplies.

Table 18. Power supplies

Part number	Feature code	Description	Maximum supported x3850 X6	Models where used
44X4150	A54D	IBM 1400W HE Redundant Power Supply for altitudes >5000 meters	4	A7x, A8x, A9x
44X4152	A54E	IBM 1400W HE Redundant Power Supply	4	-
44X4132	A4R0	IBM 900W Power Supply	4	A4x, B1x, B3x, C1x, C4x
88Y7433	A2EA	IBM 750W High Efficiency -48 V DC Power Supply	4	-

An AC power supply ships standard with one 2.8 m C13 - C14 power cord.

Integrated virtualization

The server supports VMware ESXi that is installed on a USB memory key. The key is installed in a USB socket that is on the primary I/O book inside the server. The following table lists the virtualization options.

Table 19. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8382	A4WZ	IBM USB Memory Key for VMware ESXi 5.1 U1	1

Systems management

The server contains IBM Integrated Management Module II (IMM2), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. The IMM2 also provides a virtual presence capability for remote server management capabilities.

The IMM2 provides remote server management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The remote presence provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 75 Hz with up to 23 bits per pixel colors, regardless of the system state
- Remotely accessing the server by using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture feature to assist in determining the cause of the hang condition.

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2008 R2
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T
- SUSE Linux Enterprise Server 11 for AMD64/EM64T
- VMware vSphere 5.5 (ESXi)
- VMware vSphere 5.1 (ESXi)

For the latest information about the specific versions and service levels that are supported and any other prerequisites, see the IBM ServerProven® website at the following address:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

Physical and electrical specifications

Dimensions and weight:

- Height: 173 mm (6.8 in.)
- Width: 482 mm (19.0 in.)
- Depth: 804 mm (31.6 in.); 903 mm (35.5 in.) with Full-length I/O Book installed
- Weight:
  - Minimum configuration: 35.9 kg (79.2 lb)
  - Typical configuration: 46.4 kg (102.3 lb)
  - Maximum configuration: 54.7 kg (120 lb)

Supported environment:

- Air temperature:
  - Server on: 5 °C to 40 °C (41 °F to 104 °F); altitude: 0 - 3,050 m (10,000 ft).
  - Server off: 5 °C to 45 °C (41 °F to 113 °F); altitude: 0 - 3,050 m (10,000 ft).
  - Shipment: -40 °C to 60 °C (-40 °F to 140 °F)
- Humidity:
  - Server on: 8% - 85%, maximum dew point 24 °C
  - Server off: 8% - 85%, maximum dew point 27 °C
- Electrical:
  - Models with 1400 W AC power supplies:
    - 100 -127 (nominal) V AC; 50 Hz or 60 Hz; 10 A (900 W DC output)
    - 200 - 240 (nominal) V AC; 50 Hz or 60 Hz; 8 A (1400 W DC output)
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.16 kVA
      - Maximum configuration: 3.2 kVA
  - Models with 900 W AC power supplies:
    - 100 - 127 (nominal) V AC; 50 Hz or 60 Hz; 10.7 A
    - 200 - 240 (nominal) V AC; 50 Hz or 60 Hz; 5.3 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.16 kVA
      - Maximum configuration: 2.0 kVA
  - Models with 750 W DC power supplies:
    - -40 to -75 (nominal) V DC
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.16 kVA
      - Maximum configuration: 1.7 kVA
- BTU output:
  - Minimum configuration: 546 Btu/hr (160 watts)
  - Maximum configuration: 10,912 Btu/hr (3,200 watts)
- Noise level:
  - 6.6 bels (operating)
  - 6.4 bels (idle)

Warranty options

The IBM System x3850 X6 has a three-year onsite warranty with 9x5/next business day terms. IBM offers the warranty service upgrades through IBM ServicePac offerings. IBM ServicePac is a series of prepackaged warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

IBM ServicePac offerings are country-specific, that is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePac offerings might be available in a particular country. For more information about the IBM ServicePac offerings that are available in your country, visit the IBM ServicePac Product Selector at the following address:

https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains the warranty service definitions in more detail.

Table 20. Warranty service definitions

Term	Description
IBM onsite repair (IOR)	A service technician comes to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at your customer’s location within two hours after remote problem determination is complete. We provide service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at your customer’s location within four hours after remote problem determination is complete. We provide service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at your customer’s location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m. it is determined that onsite service is required, the customer can expect the service technician to arrive the morning of the following business day. For noncritical service requests, a service technician arrives by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at your customer’s location on the business day after we receive your call, following remote problem determination. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the types of IBM ServicePac offerings are as follows:

- Warranty and maintenance service upgrades:
  - One, 2, 3, 4, or 5 years of 9x5 or 24x7 service coverage
  - Onsite repair from next business day to 4 or 2 hours
  - One or two years of warranty extension
- Remote technical support services:
  - One or three years with 24x7 coverage (severity 1) or 9x5/next business day for all severities
  - Installation and start-up support for System x servers
  - Remote technical support for System x servers
  - Software support - Support Line:
    - Microsoft or Linux software
    - VMware
    - IBM Systems Director

Regulatory compliance

The server conforms to the following regulations:

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22, Class A
- IEC 60950-1(CB Certificate and CB Test Report)
- China CCC (GB4943), GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, and GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1, EK1-ITB2000)

External disk storage expansion

The server supports attachment to external storage expansion enclosures, such as the EXP2500 series, by using the ServeRAID M5120 SAS/SATA Controller. The server can also be attached to supported external storage systems, such as the IBM System Storage® DS3500 series, by using a supported HBA (see the earlier "Storage HBA" section). The following table shows the RAID controllers and options for external disk storage expansion.

Table 21. RAID controllers and options for external disk storage expansion

Part number	Feature code	Description	Maximum supported x3850 X6	Standard models where used
81Y4478	A1WX	ServeRAID M5120 SAS/SATA Controller	2	-
Hardware upgrades for the M5120				
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	1	-
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5120				
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler	1*	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key	1*	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade	1*	-

* These M5120 features upgrades require a cache memory upgrade (81Y4487 or 81Y4559).

The ServeRAID M5120 SAS/SATA Controller has the following specifications:

- Eight external 6 Gbps SAS/SATA ports
- Up to 6 Gbps throughput per port
- Two external x4 mini-SAS connectors (SFF-8088)
- Supports RAID 0, 1, and 10
- Supports RAID 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 upgrade
- Supports 512 MB or 1 GB flash-backed cache
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller
- Supports connectivity to the EXP2512 and EXP2524 storage expansion enclosures

For more information, see the IBM Redbooks Product Guide *ServeRAID M5120 SAS/SATA Controller for IBM System x*, TIPS0858, found at the following website:
http://www.redbooks.ibm.com/abstracts/tips0858.html?Open

The ServeRAID M5120 SAS/SATA Controller supports connectivity to the IBM System Storage external expansion enclosures that are listed in the following table. Up to nine expansion enclosures can be daisy-chained per one M5120 external port. For better performance, distribute expansion enclosures evenly across both M5120 ports.

Table 22. IBM System Storage external expansion enclosures

Part number	Description	Maximum quantity supported per one M5120
172701X	IBM System Storage EXP3000	
174712X	IBM System Storage EXP2512 Express	18
174724X	IBM System Storage EXP2524 Express	9

The external SAS cables that are listed in the following table support connectivity between external expansion enclosures and the ServeRAID M5120 SAS/SATA Controller.

Table 23. External SAS cables for external storage expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
39R6531	IBM 3 m SAS Cable	1
39R6529	IBM 1 m SAS Cable	1

The following table lists the drives that are supported by EXP2512 external expansion enclosures.

Table 24. Drive options for EXP2512 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
3.5" NL SAS HS HDDs		
49Y1903	1TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
49Y1902	2TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
90Y8720	3TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
46W0975	4TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
3.5" SAS HS HDDs		
49Y1899	300GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1900	450GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1901	600GB 15,000 rpm 6Gb SAS 3.5" HDD	12

The following table lists the hard disk drives that are supported by EXP2524 external expansion enclosures.

Table 25. Drive options for EXP2524 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
2.5" NL SAS HS HDDs		
49Y1898	500GB 7,200 rpm 6Gb SAS NL 2.5" HDD	24
81Y9952	1TB 7,200 rpm 6Gb SAS NL 2.5" HDD	24
2.5" SAS HS HDDs		
49Y1896	146GB 15,000 rpm 6Gb SAS 2.5" HDD	24
81Y9944	300GB 15,000 rpm 6Gb SAS 2.5" HDD	24
00W1595	600GB 10,000 rpm 6Gb SAS 2.5" HDD	24
46W0970	900GB 10,000 rpm 6Gb SAS 2.5" HDD	24
46W0980	1.2TB 10,000 rpm 6Gb SAS 2.5" HDD	24
2.5" SAS HS SSDs		
49Y6072	200GB 6Gb SAS 2.5" SSD	24
49Y6077	400GB 6Gb SAS 2.5" SSD	24

External disk storage systems

The following table lists the external storage systems that are supported by the server and can be ordered through the System x sales channel. The server might support other IBM disk systems that are not listed in this table. For more information, see the IBM System Storage Interoperation Center found at http://www.ibm.com/systems/support/storage/ssic.

Table 26. External disk storage systems

Part number	Description
1746A2D	IBM System Storage DS3512 Express Dual Controller Storage System
1746A2S	IBM System Storage DS3512 Express Single Controller Storage System
1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System
1746A4S	IBM System Storage DS3524 Express Single Controller Storage System
181494H	IBM System Storage DS3950 Model 94
181498H	IBM System Storage DS3950 Model 98
181492H	IBM System Storage EXP395 Expansion Unit
1746A2E	IBM System Storage EXP3512 Express Storage™ Expansion Unit
1746A4E	IBM System Storage EXP3524 Express Storage Expansion Unit

For more information, see the list of IBM Redbooks Product Guides in the System Storage category found at http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage.

External backup units

The server supports the external backup attachment options that are listed in the following table.

Table 27. External backup options (Part 1)

Part number	Description
External tape expansion enclosures for internal tape drives	
87651UX	1U Tape Drive Enclosure
8767HHX	Half High Tape Drive Enclosure
87651NX	1U Tape Drive Enclosure (with Nema 5-15P LineCord)
8767HNX	Half High Tape Drive Enclosure (with Nema 5-15P LineCord)
Tape enclosure adapters (with cables)	
40K2599	SAS Enclosure Adapter Kit
Internal backup drives supported by external tape enclosures	
43W8478	IBM Half High LTO Gen 3 SAS Tape Drive
44E8895	IBM Half High LTO Gen 4 SAS Tape Drive
49Y9898	IBM Half High LTO Gen 5 Internal SAS Tape Drive
00D8924	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive

Table 27. External backup options (Part 2)

Part number	Description
External backup units*	
36251TY	IBM RDX External USB 3.0 Dock with 1TB Cartridge
362532Y	IBM RDX External USB 3.0 Dock with 320GB Cartridge
362550Y	IBM RDX External USB 3.0 Dock with 500GB Cartridge
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US power cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US power cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US power cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without power cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without power cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without power cord)
3580S3V	System Storage TS2230 Tape Drive Express Model H3V
3580S4V	System Storage TS2240 Tape Drive Express Model H4V
3580S5E	System Storage TS2250 Tape Drive Express Model H5S
3580S5X	System Storage TS2350 Tape Drive Express Model S53
3572S4R	TS2900 Tape Library with LTO4 HH SAS drive & rack mount kit
3572S5R	TS2900 Tape Library with LTO5 HH SAS drive & rack mount kit
35732UL	TS3100 Tape Library Model L2U Driveless
35734UL	TS3200 Tape Library Model L4U Driveless
46X2682†	LTO Ultrium 5 Fibre Channel Drive
46X2683†	LTO Ultrium 5 SAS Drive Sled
46X2684†	LTO Ultrium 5 Half High Fibre Drive Sled
46X2685†	LTO Ultrium 5 Half High SAS Drive Sled
46X6912†	LTO Ultrium 4 Half High Fibre Channel Drive Sled
46X7117†	LTO Ultrium 4 Half High SAS DriveV2 Sled
46X7122†	LTO Ultrium 3 Half High SAS DriveV2 Sled

* Note: The external tape drives that are listed can be ordered through the System x sales channel. The server might support other IBM tape drives that are not listed in this table. For more information, see the IBM System Storage Interoperability Center.
† Note: These part numbers are the tape drives options for 35732UL and 35734UL.

For more information, see the list of IBM Redbooks Product Guides in the Backup units category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape

Top-of-rack Ethernet switches

The server supports the top-of-rack Ethernet switches from IBM System Networking that are listed in the following table.

Table 28. IBM System Networking - Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
0446013	IBM System Networking RackSwitch™ G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309CD8	IBM System Networking RackSwitch G8000DC
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
427348E	IBM Ethernet Switch J48E
6630010	Juniper Networks EX2200 24 Port
6630011	Juniper Networks EX2200 24 Port with PoE
6630012	Juniper Networks EX2200 48 Port
6630013	Juniper Networks EX2200 48 Port with PoE
IBM System Networking - 10 Gb top-of-rack switches	
7309DRX	IBM System Networking RackSwitch G8264CS (Rear to Front)
7309DFX	IBM System Networking RackSwitch G8264CS (Front to Rear)
7309BD5	IBM System Networking RackSwitch G8124DC
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
0719410	Juniper Networks EX4500 - Front to Back Airflow
0719420	Juniper Networks EX4500 - Back to Front Airflow
IBM System Networking - 40 Gb top-of-rack switches	
8036BRX	IBM System Networking RackSwitch G8332 (Rear to Front)
8036BFX	IBM System Networking RackSwitch G8332 (Front to Rear)
8036ARX	IBM System Networking RackSwitch G8316R
8036AFX	IBM System Networking RackSwitch G8316F

For more information, see the list of IBM Redbooks Product Guides in the Top-of-rack switches category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tor

Uninterruptible power supply units

The server supports attachments to the uninterruptible power supply (UPS) units that are listed in the following table.

Table 29. Uninterruptible power supply units

Part number	Description
Rack-mounted UPS	
24195KX	IBM UPS5000
21303RX	IBM UPS 7500XHV
21304RX	IBM UPS 10000XHV
53952AX	IBM 2200VA LCD 2U Rack UPS (100V/120V)
53952KX	IBM 2200VA LCD 2U Rack UPS (230V)
53953AX	IBM 3000VA LCD 3U Rack UPS (100 V/120 V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200 V/208 V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200 V/208 V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230 V)
53959KX	IBM 11000VA LCD 5U Rack UPS (200V/208V/230V)

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Power distribution units

The server supports attachments to the power distribution units (PDUs) that are listed in the following table.

Table 30. Power distribution units (part 1)

Part number	Description
Switched and Monitored PDUs	
46M4002	IBM 1U 9 C19/3 C13 Active Energy Manager DPI PDU
46M4003	IBM 1U 9 C19/3 C13 Active Energy Manager 60A 3 Phase PDU
46M4004	IBM 1U 12 C13 Active Energy Manager DPI PDU
46M4005	IBM 1U 12 C13 Active Energy Manager 60A 3 Phase PDU
46M4167	IBM 1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4116	IBM 0U 24 C13 Switched and Monitored 30A PDU
46M4119	IBM 0U 24 C13 Switched and Monitored 32A PDU
46M4134	IBM 0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4137	IBM 0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU
Enterprise PDUs	
71762MX	IBM Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	IBM Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU+ (NA)
71763NU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU (NA)
39M2816	IBM DPI C13 Enterprise PDU without power cord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed power cord
39Y8941	DPI Single Phase C13 Enterprise PDU without power cord
39Y8948	DPI Single Phase C19 Enterprise PDU without power cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30 amp/125 V Front-end PDU with NEMA L5-30P connector
39Y8939	30 amp/250 V Front-end PDU with NEMA L6-30P connector
39Y8940	60 amp/250 V Front-end PDU with IEC 309 60A 2P+N+Gnd connector

Table 30. Power distribution units (part 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV power cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU with Denmark LC
39Y8954	DPI Universal Rack PDU with Israel LC
39Y8955	DPI Universal Rack PDU with Italy LC
39Y8956	DPI Universal Rack PDU with South Africa LC
39Y8957	DPI Universal Rack PDU with UK LC
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU with China LC
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
0U Basic PDUs	
46M4122	IBM 0U 24 C13 16A 3 Phase PDU
46M4125	IBM 0U 24 C13 30A 3 Phase PDU
46M4128	IBM 0U 24 C13 30A PDU
46M4131	IBM 0U 24 C13 32A PDU
46M4140	IBM 0U 12 C19/12 C13 60A 3 Phase PDU
46M4143	IBM 0U 12 C19/12 C13 32A 3 Phase PDU

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Rack cabinets

The server supports the rack cabinets that are listed in the following table.

Table 31. Rack cabinets

Part number	Description
201886X	IBM 11U Office Enablement Kit
93072PX	IBM 25U Static S2 Standard Rack
93072RX	IBM 25U Standard Rack
93074RX	IBM 42U Standard Rack
93074XX	IBM 42U Standard Rack Extension
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise Rack
93604EX	IBM 42U 1200mm Deep Dynamic Expansion Rack
93604PX	IBM 42U 1200mm Deep Dynamic Rack
93614EX	IBM 42U 1200mm Deep Static Expansion Rack
93614PX	IBM 42U 1200mm Deep Static Rack
93624EX	IBM 47U 1200mm Deep Static Expansion Rack
93624PX	IBM 47U 1200mm Deep Static Rack
93634AX	IBM PureFlex™ System 42U Rack
93634BX	IBM PureFlex System 42U Expansion Rack
93634CX	IBM PureFlex System 42U Rack
93634DX	IBM PureFlex System 42U Expansion Rack
93634EX	IBM 42U 1100mm Dynamic Expansion Rack
93634PX	IBM 42U 1100mm Dynamic Rack

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category found at the following address:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

Rack options

The server supports the rack console switches and monitor kits that are listed in the following table.

Table 32. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
17238BX	A3EK	IBM 1U 18.5" Standard Console
17238EX	A3EL	IBM 1U 18.5" Enhanced Media Console
172317X	0051	1U 17in Flat Panel Console Kit
172319X	0052	1U 19in Flat Panel Console Kit
Console switches		
3858D3X	3858HC1 fc A4X1	Avocent Universal Management Gateway 6000 for IBM
1754D2X	6695	IBM Global 4x2x32 Console Manager (GCM32)
1754D1X	6694	IBM Global 2x2x16 Console Manager (GCM16)
1754A2X	0726	IBM Local 2x16 Console Manager (LCM16)
1754A1X	0725	IBM Local 1x8 Console Manager (LCM8)
Console cables		
43V6147	3757	IBM Single Cable USB Conversion Option (UCO)
39M2895	3756	IBM USB Conversion Option (4 Pack UCO)
46M5383	5341	IBM Virtual Media Conversion Option Gen2 (VCO2)
46M5382	5340	IBM Serial Conversion Option (SCO)

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category found at the following address:
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Related publications and links

For more information, see these resources:

- IBM System x3850 X6 and x3950 X6 product page
  http://www.ibm.com/systems/x/hardware/rack/x3850X6/index.html
- ServerProven hardware compatibility page for the x3850 X6 and x3950 X6
  http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/xseries/3837.html
- IBM Redbooks Product Guides for IBM System x servers and options
  http://www.redbooks.ibm.com/portals/systemx?Open&page=pgbycat
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- xREF - IBM System x Reference Sheets
  http://www.redbooks.ibm.com/xref
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